

What is claimed is:

- [c1] 1. A method for providing data from a client to an access concentrator using a gateway, the method comprising the steps of:
- receiving, at a gateway, a non-PPPoE frame from the client, wherein the non-PPPoE frame includes data intended for receipt by the access concentrator;
- encapsulating, at the gateway, the first non-PPPoE frame to generate a PPPoE frame, wherein the PPPoE frame includes the data intended for receipt by the access concentrator; and
- providing the PPPoE frame to the access concentrator from the gateway.
- [c2] 2. The method of Claim 1, further comprising the step of initiating a PPPoE session between the gateway and the access concentrator for the client.
- [c3] 3. The method of Claim 1, wherein the non-PPPoE frame includes an IP packet.
- [c4] 4. The method of Claim 1, wherein the gateway includes one of a group consisting of: a digital subscriber line modem, a cable modem, a router, and a wireless access point.
- [c5] 5. The method of Claim 1, wherein receiving the non-PPPoE frame from the client includes the steps of:
- receiving, at an input interface, the non-PPPoE frame from the client;
- providing the non-PPPoE frame to a bridge;
- forwarding the non-PPPoE frame to a PPPoE stack from the bridge.
- [c6] 6. The method of Claim 5, wherein the input interface includes an Ethernet interface.
- [c7] 7. The method of Claim 5, wherein modifying the non-PPPoE frame to generate a PPPoE frame includes the steps of:
- adding, at the PPPoE stack, a PPP header to the non-PPPoE frame to generate a PPPoE frame; and
- adding, at the PPPoE stack, a PPPoE header to the PPPoE frame to generate a PPPoE frame.
- [c8] 8. The method of Claim 7, wherein providing the PPPoE frame to the access

concentrator includes the steps of:

providing the PPPoE frame from the PPPoE stack to a frame reflector;

providing the PPPoE frame from the frame reflector to the bridge; and

providing the PPPoE frame from the bridge to an output interface for output to the access concentrator.

[c9] 9. The method of Claim 8, wherein the output interface includes a UTOPIA interface.

[c10] 10. The method of Claim 9, wherein the output interface further includes a RFC 1483 interface.

[c11] 11. The method of Claim 1, further comprising the steps of:
receiving, at the gateway, a PPPoE frame from the access concentrator, wherein the PPPoE frame includes data intended for receipt by the client;
modifying, at the gateway, the PPPoE frame to generate a non-PPPoE frame, wherein the non-PPPoE frame includes the data intended for receipt by the client; and
providing the non-PPPoE frame to client from the gateway.

[c12] 12. A method for providing data from an access concentrator to a non-PPPoE client using a gateway, the method comprising the steps of:
receiving, at a gateway, a PPPoE frame from the access concentrator, wherein the PPPoE frame includes data intended for receipt by the client;
deencapsulating, at the gateway, the PPPoE frame to generate a non-PPPoE frame, wherein the non-PPPoE frame includes the data intended for receipt by the client; and
providing the non-PPPoE frame to the client from the gateway.

[c13] 13. The method of Claim 12, further comprising the step of initiating a PPPoE session between the gateway and the access concentrator for the client.

[c14] 14. The method of Claim 12, wherein the non-PPPoE frame includes an IP packet.

[c15] 15. The method of Claim 12, wherein the gateway includes one of a group

consisting of: a digital subscriber line modem, a cable modem, a router, and a wireless access point.

[c16] 16. The method of Claim 12, wherein receiving the PPPoE frame from the access concentrator includes the steps of:

receiving, at an input interface, the PPPoE frame from the access concentrator;
providing the PPPoE frame to a bridge; and
providing the PPPoE frame from the bridge to a PPPoE stack using a frame reflector.

[c17] 17. The method of Claim 16, wherein the input interface includes a UTOPIA interface.

[c18] 18. The method of Claim 17, wherein the input interface further includes a RFC 1483 interface.

[c19] 19. The method of Claim 16, wherein the step of deencapsulating the PPPoE frame to generate a non-PPPoE frame includes the steps of:
removing, at the PPPoE stack, a PPPoE header from the PPPoE frame to generate a PPP frame; and
removing, at the PPPoE stack, a PPP header from the PPP frame to generate a non-PPPoE frame.

[c20] 20. The method of Claim 16, wherein providing the non-PPPoE frame to the client includes the steps of:
providing the non-PPPoE frame from the PPPoE stack to the frame reflector;
providing the non-PPPoE frame from the frame reflector to the bridge; and
providing the non-PPPoE frame from the bridge to an output interface for output to the client.

[c21] 21. The method of Claim 20, wherein the output interface includes an Ethernet interface.

[c22] 22. A method for transporting data among clients and access concentrators, the method comprising the steps of:
receiving, at a bridge, a first frame having a PPPoE format from a first client,

wherein the first frame is intended for receipt by an access concentrator;
receiving, at the bridge, a second frame having a non-PPPoE format from a second client, wherein the second frame is intended for receipt by an access concentrator;
providing, from the bridge, the first frame to an interface for output to an access concentrator;
providing, from the bridge, the second frame as an IP packet to an IP stack;
routing the IP packet to a PPPoE stack;
encapsulating, at the PPPoE stack, the IP packet into a third frame having a PPPoE format; and
providing the third frame to the interface for output to an access concentrator.

[c23] 23. The method of Claim 22, wherein the first client is adapted to support a PPPoE session and the second client is not adapted to support a PPPoE session.

[c24] 24. The method of Claim 22, wherein the first frame and the second frame are intended for receipt by a same access concentrator.

[c25] 25. The method of Claim 22, wherein providing the first frame to the interface includes the steps of:
determining a destination media access control address of the first frame; and
providing the first frame to the interface when the destination media access control address of the first frame includes a media access control address of a network device accessible by the interface.

[c26] 26. The method of Claim 25, wherein providing the second frame as the IP packet to the IP stack includes the steps of:
determining a destination media access control address of the second frame;
and
providing the second frame as the IP packet to the IP stack when the destination media access control address of the second frame is an media access control address of an interface attached to the bridge.

[c27] 27. The method of Claim 22, wherein encapsulating the IP packet to generate the third frame includes the steps of:

adding a PPP header to the IP packet to generate a modified frame; and
adding a PPPoE header to the modified frame to generate the third frame.

[c28]

28. The method of Claim 27, wherein providing the third frame includes the steps of:

assigning a destination media access control address to the third frame corresponding to a media access control address of a frame reflector used to transmit the third frame between the PPPoE stack and the bridge;
providing the third frame to the bridge using the frame reflector; and
providing, at the bridge, the third frame to the output interface based on the destination media access control address of the third frame.

[c29]

29. The method of Claim 22, further comprising the steps of:

receiving, at the bridge, a fourth frame having a PPPoE format from an access concentrator, wherein the fourth frame from the access concentrator is intended for receipt by the first client, and where the first client is adapted to receive frames having the PPPoE format;

receiving, at the bridge, a fifth frame having a PPPoE format from the access concentrator, wherein the fifth frame is intended for receipt by the second client, and where the second client is adapted to receive frames having a non-PPPoE format;

providing, from the bridge, the fourth frame to an interface for output to the first client;

providing, from the bridge, the fifth frame to a PPPoE stack using a frame reflector;

deencapsulating, at the PPPoE stack, the fifth frame to generate a sixth frame having the non-PPPoE format; and

providing the sixth frame to the interface for output to the second client.

[c30]

30. A system comprising:

a first interface adapted to receive a first frame having a non-PPPoE format from a first client and to provide a second frame having a non-PPPoE format to the first client;

a second interface adapted to receive a third frame having a PPPoE format from

an access concentrator and to provide a fourth frame having a PPPoE format to the access concentrator;

a PPPoE stack adapted to encapsulate the first frame having a non-PPPoE format into the fourth frame having a PPPoE format, and wherein the PPPoE stack further is to deencapsulate the third frame having a PPPoE format into the second frame having a non-PPPoE format;

a bridge coupled to the first interface and the second interface, wherein the bridge is adapted to provide the fourth frame to the second interface for output to the access concentrator and to provide the second frame to the first interface for output to the first client;

an IP stack coupled to the PPPoE stack and the bridge, wherein the IP stack is adapted to route the first frame from the bridge to the PPPoE stack and to route the second frame from the PPPoE stack to the bridge; and

a frame reflector coupled to the PPPoE stack and the bridge, wherein the frame reflector is adapted to provide the fourth frame to the bridge from the PPPoE stack and to provide the first frame from the bridge to the PPPoE stack.

- [c31] 31. The system of Claim 30, wherein the first interface includes an Ethernet interface.
- [c32] 32. The system of Claim 30, wherein the second interface includes a UTOPIA interface.
- [c33] 33. The system of Claim 32, wherein the second interface further includes a RFC 1483 interface.
- [c34] 34. The system of Claim 30, wherein the PPPoE stack includes:
- a PPP client layer coupled to the bridge, wherein the PPP client layer is adapted to initiate a PPPoE session between the PPP client layer and the access concentrator, and where the PPP client layer is adapted to add a PPP header to the first frame and to remove a PPP header from the third frame; and
- a PPPoE client layer coupled to the PPP client layer and to the frame reflector, wherein the PPPoE client layer is adapted to add a PPPoE header to the first frame and to remove a PPPoE header from the third frame.

[c35] 35. The system of Claim 30, wherein:
the first interface includes a first media access control address;
the second interface includes a second media access control address;
the frame reflector includes a third and fourth media access control address;
and
wherein the bridge is adapted to route the first frame, the second frame, the third frame, and the fourth frame based on a destination media access control address of each frame.

[c36] 36. In a distributed network comprising a plurality of clients in communication with at least one gateway over a network and in communication with at least one access concentrator via the gateway, the gateway comprising:
a first interface adapted to receive a first non-PPPoE frame from a first client and to provide a second non-PPPoE frame to the first client;
a second interface adapted to provide a first PPPoE frame to an access concentrator and to receive a second PPPoE frame from the access concentrator;
a means for encapsulating the first non-PPPoE frame to generate the first PPPoE frame; and
a means for deencapsulating the second PPPoE frame to generate the second non-PPPoE frame.

[c37] 37. The gateway of Claim 36, wherein:
the first interface further is adapted to receive a third PPPoE frame from a second client and to provide a fourth PPPoE frame to the second client;
the second interface further is adapted to receive the fourth PPPoE frame from an access concentrator and to provide the third PPPoE frame to the access concentrator.

[c38] 38. The gateway of Claim 37, further comprising:
a means for providing the third PPPoE frame from the first interface to the second interface; and
a means for providing the fourth PPPoE frame from the second interface to the first interface.

[c39] 39. The gateway of Claim 36, wherein the first interface includes an Ethernet

interface.

[c40] 40. The gateway of Claim 36, wherein the second interface includes a UTOPIA interface.

[c41] 41. The gateway of Claim 36, wherein the second interface further includes a RFC 1483 interface.

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